

## REMARKS

The title of the application has been amended to correspond to the application as filed.

Claims 25-34 are currently pending. The Applicants confirm the earlier election, without traverse, of the composition inventions of Group I, drawn to hot rolled steel plate and its product, a welded steel pipe. Claims 35-48 are withdrawn. Paragraph [0183] (Table 2) in the Specification has been amended to correct a typographical transposition error.

The Applicants thank the Examiner for the interview of April 17, 2008. Claims 25-34 have been amended to affirmatively recite complex carbide precipitates in the ferritic phase consistent with the discussion of Tamehiro and Asahi which do not disclose such precipitates and the Examiner's helpful guidance. Additionally, this response and the amendments reflect the fact that the claimed steels are made by a process that is significantly different than that of the prior art and that the steels made using this process would have different metal structures than the prior art steels.

Claims 25-34 have been rejected under 35 U.S.C. §103(a) as obvious over Tamehiro. The rejection states that Tamehiro describes steel alloy compositions with constituent percent by mass ranges that overlap those of the Applicants' compositions. The rejection also states that the steel compositions of Tamehiro comprise a microstructure having a ferrite fraction of 20 to 90%, bainite and martensite which "suggest[s]" the steel compositions having the metal structure claimed by the Applicants'. The rejection states Tamehiro does not teach complex carbides precipitated in the ferrite phase, but implies that such precipitates might be inherently present in the compositions of Tamehiro. Last, the rejection states Tamehiro teaches the steel compositions disclosed therein can be used to make welded steel pipes.

Claims 25-34 are not obvious under 35 U.S.C. §103(a) over Tamehiro. According to the rejection the steel compositions having specific metal structures recited in independent claims 25-27 and dependent claims 28-34 are obvious over Tamehiro. First, only the use and object of the cited reference Tamehiro is the same as independent claims 25-34 of the Application. Second, the claimed compositions having the specified metal structures are not the same as those of Tamehiro. Third, the compositions of Tamehiro have, as recited in independent Claims 1 and 6 of Tamehiro, a ferrite fraction of 20% to 90% wherein the ferrite contains 50% to 100% worked ferrite. Fourth, Tamehiro imposes a limitation on the production conditions used to make the steels described therein with steps comprising, rolling with rigorous control in the ferrite-austenite two-phase zone, and air cooling or accelerated cooling to form a fine ferrite-

martensite/bainite mixed structure so as to secure ultra high strength, excellent low temperature toughness, field weldability and softening of the weld portion. See Tamehiro column 8, line 40 to column 10, line 4. Specifically, a slab is first re-heated to a temperature within the range of 950°C to 1,300°C and is then hot rolled so that the cumulative rolling reduction ratio is at least 50% at a temperature not higher than 950°C, the cumulative rolling reduction ratio is 10% to 70%, preferably 15% to 50%, in the ferrite-austenite two-phase zone of an Ar<sub>3</sub> point to an Ar<sub>1</sub> point, and the hot rolling finish temperature is 650°C to 800°C. Thereafter, the hot rolled steel plate of Tamehiro is cooled with air, or is cooled at a cooling rate of at least 10°C/sec to an arbitrary temperature not higher than 500°C.

Claims 25-27 of this Application require the steel compositions to comprise a substantially three-phase structure of ferrite, bainite and island martensite, an area fraction of the island martensite that is 3% to 20%, and complex carbides in a ferritic phase. Importantly, worked ferrite as disclosed in Tamehiro is not included at all. In claims 25-27, withdrawn method claim 35 for manufacturing these steels, and the English specification of this Application at paragraphs [0059]-[0066] the claimed steel compositions with the specified metal structures are made by hot rolling conducted at a heating temperature of 1,000°C to 1,300°C and a rolling finish temperature of Ar<sub>3</sub> or more. In contrast, hot rolling in the ferrite-austenite two-phase zone, as described by Tamehiro is not performed when making the claimed steel compositions having the specified metal structures so that worked ferrite is not included at all in these compositions. Importantly, the steels of this Application are made at a hot rolling finish temperature of 870°C or greater, which is significantly higher than the hot rolling finish temperature of 650°C to 800°C Tamehiro. Consequently, the rejection fails to establish that the combination of Tamehiro and the knowledge available to one of ordinary skill in the art would teach all the elements of the compositions of Claims 25-34. The rejection thus fails to establish *prima facie* obviousness. The Applicants respectfully request withdrawal of the rejections of Claims 25-34 as obvious under 35 U.S.C. §103(a) over Tamehiro.

Claims 25-34 are also not obvious under 35 U.S.C. §103(a) over Tamehiro under at least a second rationale. Tamehiro does not expressly teach a metal structure that is a “three-phase structure of ferrite, bainite, and island martensite...[where] the area fraction of island martensite is about 3 to about 20%” or that contains “complex carbide” precipitates in a ferritic phase. Instead, Tamehiro simply states that the “micro-structure of the steel material must comprise a predetermined amount of martensite-bainite and...the ferrite fraction must be 20-90% (or the

martensite/bainite fraction must be 10 to 80%)." This means that Tamehiro is silent as to whether the "area fraction of island martensite is about 3 to 20% [ (emphasis added)]" or whether "complex carbide" precipitates are present in a ferritic phase. Instead, Tamehiro merely teaches the combined fraction of martensite and bainite must be 10 to 80%. In other words, a metal structure having an "area fraction of island martensite [of] about 3-20%" or that contains "complex carbide" precipitates in a ferritic phase is not expressly taught in Tamehiro.

Furthermore, it cannot fairly be said that the compositions of Tamehiro inherently comprise a metal structure having an "area fraction of island martensite [of] about 3-20%" or "complex carbide" precipitates in a ferritic phase. This is because steels with identical chemical compositions, can form different metal microstructures depending on the conditions used to make such steels. This is vividly demonstrated by comparison of the martensite area fraction percentage of steel compositions of type "D" made using different methods as shown in Table 4 of this Application, and the martensite area fraction percentage of steel compositions of type "A" made using different methods as shown in Table 6 of this Application. The data in these comparative examples demonstrates that metal microstructure, and martensite area fraction percentage specifically, is not simply a function of the chemical composition of a steel, but is instead also a function of the methods used to make a steel.

The fact that a certain characteristic may be present in the prior art is not sufficient to establish the inherency of that characteristic. See In re Rijckaert, 9 F.3d 1531 (Fed. Cir. 1993). To establish inherency any missing descriptive matter must necessarily be present in the compositions described in a reference and also must be recognized by persons of ordinary skill in the art. See In re Roberston, 169 F.3d 743, 745 (Fed. Cir. 1999). Inherency cannot be established by mere "probabilities or possibilities." See In re Roberston, 169 F.3d 743, 745 (Fed. Cir. 1999).

As shown in Table 4 and 6 steels with identical, or even overlapping, chemical compositions such as those in Tamehiro do not all necessarily contain a metal structure having an "area fraction of island martensite [of] about 3-20%[.]" Instead, Tables 4 and 6 show that identical compositions, and even very similar compositions, can have very different metal structures and area fraction of island martensite values. Importantly, the compositions of Tamehiro and the claimed compositions are made using substantially different starting materials and processes. This is important, because these differences introduce multiple variables which might, or might not, produce steels having metal structures with an area fraction of island

martensite of about 3-20%, more than 3-20%, or less than 3-20% or which do, or do not, contain complex carbide precipitates in a ferritic phase. One important difference is that a hot rolling finish temperature of 870°C or greater is used to make the claimed steels. This is different than Tamehiro which used much lower hot rolling finish temperatures from 650°C to 800°C. Either way it cannot be said with any certainty that the steels of Tamehiro, which were manufactured using substantially different starting materials and processes, must necessarily have a metal structure having an “area fraction of island martensite [of] about 3-20%” or one containing complex carbide precipitates in a ferritic phase. This is because the formation of precipitates and crystal formation is dependent on a host of different variables including, for example, the presence of condensation nuclei, the temperatures used, heating rates, cooling rates, and the length of time heating or cooling steps are performed, as well as the matrix or solution in which the precipitates or crystals are formed. This is consistent with the teachings of Tamehiro itself which discloses that “production conditions” must be carefully controlled and that chemically identical steel compositions made using different methods can have different microstructures. *See e.g.* Tamehiro at column 8, line 50; column 14, line 1; and column 17, line 1. These teachings of Tamehiro must also be taken into account, because prior art must be considered as a whole for all that it teaches. *See e.g. W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540 (Fed. Cir. 1983). In light of the foregoing, one skilled in the art would also not recognize, or otherwise acknowledge, that the steels of Tamehiro made using different manufacturing techniques and starting materials must contain an “area fraction of island martensite [of] about 3-20%” or must contain “complex carbide” precipitates in a ferritic phase. Consequently, Tamehiro does not disclose the compositions of Claims 25-34, because it does not describe all of the elements of these claims either expressly or inherently.

In summary, Claims 25-34 are also not obvious under 35 U.S.C. §103(a) over Tamehiro under a second rationale. First, Tamehiro fails to expressly or inherently teach all the elements of the compositions of Claims 25-34, and the rejection fails to establish one of ordinary skill in the art would recognize, or otherwise acknowledge, that the steel of Tamehiro made using different manufacturing techniques and starting materials must contain a metal structure that is a “three-phase structure of ferrite, bainite, and island martensite...[where] the area fraction of island martensite is about 3 to about 20%” or must contain “complex carbide” precipitates in a ferritic phase. Furthermore, it is self evident to state:

“That which may be inherent is not necessarily know. Obviousness cannot be predicated on what is unknown.”

See In re Spormann and Heinke, 150 U.S.P.Q. 499, 452 (CCPA 1996) (emphasis added). Consequently, the rejection fails to establish that the combination of Tamehiro and the knowledge available to one of ordinary skill in the art would teach all the elements of the compositions of Claims 25-34. Second, one of ordinary skill in the art would not enjoy a reasonable expectation of success on combining the teachings of Tamehiro with the knowledge available to one of ordinary skill in the art because making steels with the claimed metal structure would require an unreasonable amount of experimentation (consider here, for example, that the methods for making the steels having the metal structure of the “Damascus” steels of antiquity have been lost to history and that, apparently, such steels have yet to be replicated). The rejection thus fails to establish *prima facie* obviousness. The Applicants respectfully request withdrawal of the rejections of Claims 25-34 as obvious under 35 U.S.C. §103(a) over Tamehiro.

Claims 25, 26, 28, and 34 have been rejected under 35 U.S.C. §103(a) as obvious over Asahi. The rejection is apparently based on an English abstract and states that Asahi, which is in Japanese, describes steel alloy compositions with constituent percent by mass ranges that overlap those of the Applicants’ compositions. The rejection also states that the steel compositions of Asahi comprise a microstructure having a ferrite fraction of 20 to 90%, bainite and martensite which “suggest[s]” the steel compositions having the metal structure claimed by the Applicants. The rejection states Asahi does not teach complex carbides precipitated in the ferrite phase, but implies that such precipitates might be inherently present in the compositions of Asahi. Last, the rejection states Asahi teaches the steel compositions disclosed therein can be used to make welded steel pipes.

Claims 25, 26, 28, and 34 are not obvious under 35 U.S.C. §103(a) over Asahi. First, the disclosure of Tamehiro, which is discussed above, and the disclosure of Asahi are essentially the same. This is because, the cited reference Asahi (filing No. JP 7-17302) is one of six Japanese patent applications which apparently support the foreign priority claim of Tamehiro. As a result, the arguments applied above with respect to the rejections of claims 25, 26, 28, and 34 under 35 U.S.C. §103(a) as being obvious over Tamehiro also equally apply to the rejection of these claims over Asahi. Consequently, the rejection fails to establish that the combination of Asahi and the knowledge available to one of ordinary skill in the art would teach all the elements

of the compositions of Claims 25, 26, 28, and 34. The rejection thus fails to establish *prima facie* obviousness. The Applicants respectfully request withdrawal of the rejections of Claims 25, 26, 28, and 34 as obvious under 35 U.S.C. §103(a) over Asahi.

Claims 25, 26, 28, and 34 are also not obvious under 35 U.S.C. §103(a) over Asahi under a second rationale. First, the Applicants again note that Asahi is in the same patent family as Tamehiro and appears to be a related, equivalent Japanese Application. Second, based in part on the English abstract provided, it does not appear that Asahi expressly teaches a metal structure that is a “three-phase structure of ferrite, bainite, and island martensite...[where] the area fraction of island martensite is about 3 to about 20%” or “complex carbide” precipitates in a ferritic phase. Instead, Asahi appears to be silent as to whether the “area fraction of island martensite is about 3 to 20% [ (emphasis added)]” or whether “complex carbide” precipitates are present in a ferritic phase. In other words, a metal structure having an “area fraction of island martensite [of] about 3-20%” or having “complex carbides” in a ferritic phase does not appear to be expressly taught in Asahi. Furthermore, for the same reasons articulated above with regard to Tamehiro it does not appear it can fairly be said that the compositions of Asahi inherently comprise a metal structure having an “area fraction of island martensite [of] about 3-20%” or having “complex carbide” precipitates in a ferritic phase. This is because significantly different processes are used to make the claimed steels relative to the processes of Tamehiro and Asahi.

In summary, Claims 25, 26, 28, and 34 are not obvious under 35 U.S.C. §103(a) over Asahi. First, Asahi apparently fails to expressly or inherently teach all the elements of the compositions of Claims 25, 26, 28, and 34, and the rejection fails to establish one of ordinary skill in the art would recognize, or otherwise acknowledge, that the steel of Asahi presumably made using different manufacturing techniques and starting materials must contain a metal structure that is a “three-phase structure of ferrite, bainite, and island martensite...[where] the area fraction of island martensite is about 3 to about 20%” or must contain “complex carbide” precipitates in a ferritic phase. Consequently, the rejection fails to establish that the combination of Asahi and the knowledge available to one of ordinary skill in the art would teach all the elements of the compositions of Claims 25, 26, 28, and 34. Second, one of ordinary skill in the art would not appear to enjoy a reasonable expectation of success on combining the teachings of Asahi with the knowledge available to one of ordinary skill in the art because making steels with the claimed metal structure would require an unreasonable amount of experimentation. The rejection thus fails to establish *prima facie* obviousness. The Applicants respectfully request

withdrawal of the rejections of Claims 25, 26, 28, and 34 as obvious under 35 U.S.C. §103(a) over Asahi.

In light of the foregoing, the Applicants respectfully submit that the entire Application is now in condition for allowance, which is respectfully requested.

Respectfully submitted,



T. Daniel Christenbury  
Reg. No. 31,750  
Attorney for Applicants

TDC/rb  
(215) 656-3381